BLOCK READ AND WRITE CONTROL ROUTINES

1.0 CONTENTS

		Page
1.0	CONTENTS	
2.0	BLOCK READ AND WRITE CONTROL ROUTINES	1
	2.1 GENERAL	1
	2.2 CALL	1
	2.3 MACRO INSTRUCTIONS	2
	2.3.1 Initialize	2
	2.3.2 Read	3
	2.3.3 Write	3
	2.3.4 Rewind	4
	2.3.5 Test Completion	4
	2.3.6 Backspace	4
	2.3.7 Skip Erase	5
	2.3.8 Translate	5

This document is preliminary in nature and is intended as a vehicle for meeting immediate needs with regard to system familiarization and orientation. UNIVAC® Division of Sperry Rand Corporation reserves the right to change and/or modify such information contained herein as may be required by subsequent system developments.

2.0 BLOCK READ AND WRITE CONTROL ROUTINES

2.1 GENERAL

This routine provides the worker program with read, write, rewind and other tapehandling functions. It does not recognize any sentinel, label, or block conventions, and does not provide record-advance functions.

A call turns out the subroutines for performing tape functions. Macro instructions are used by the worker program to communicate with these subroutines.

2.2 CALL

LABEL	OP'N	OPERANDS
	TAPEn	$p_1,\ldots,p_{10}$

The LABEL field is blank.

The OPERATION field contains TAPE4 or TAPE5. Each turns out coding which is the same except for its labels and label references.

Parameters 1 through 10 determine the configuration of coding to be turned out.

p_1 Unit number: 0 through 15.

p_2 Channel number: 0 through 7. (Ordinarily, channels 4 and 5 are used for read functions and channel 5 is used for write functions.)

p_3 Translation mode and recording density: The appropriate value from the following table:

TAPE TYPE	TRANS. MODE	DENSITY (BPI)	p_3
3A	3	-	3
	4	-	4
	5	-	5
Compat.	BIN	200	A
		556	B
		800	C
	BCD	200	D
		556	E
		800	F

p_4 Input/output method: DMND, for demand; or STDBY, for standby.

p_5 Input/output area: Label of an area elsewhere defined by the worker program, or blank. If a label is specified, the area so labeled must be large enough to hold either 1 block (demand) or 2 blocks (standby). If p_5 is blank, an input/output area of the correct size (based on p_4 and p_6) will be generated. It will be labeled either XTAR4 or XTAR5, depending on the call.

p_6 Block size.

p_7 Ending address: Label in the worker program to which control will be transferred when an EOT condition is detected on a write function, or when a tape mark is detected on a read function.

p_8 Translation function desired: BCDI, for BCD to XS3; BCDO for XS3 to BCD; or BCDIO for both. This parameter will generate the required translation tables and coding. Translation functions will be performed only when a TRANn macro instruction is executed. [1]See footnote on page 2.

p_9 Beginning row address for the translation table(s)[1]: 0 through 63 (or 077). The table(s) will be loaded into the designated row(s) when the first TRANn macro instruction is executed. If there is a possibility that the table(s) might be altered during the course of the program, set the location labeled XTn41 to octal 00 before executing the first TRAN4. This will cause TAPE4/TAPE5 to reload the table(s) each time that a TRAN4 is executed.

Note that an Executive must be used that allocates one or two low order storage rows for translation tables. (Refer to the OPR document UP 3940.14.)

p_{10} RT[1], if the worker program is servicing real time devices; blank, otherwise. If RT is specified, the tape XF instructions associated with the program will be flagged with a priority bit when they are delivered to the tape handler. This priority bit will give them precedence over the tape XF instructions of concurrently running programs.

2.3 MACRO INSTRUCTIONS

A set of 9 macro instructions is used by the worker program to communicate with the subroutines turned out by the TAPE4 or TAPE5 call. The form of the macro instructions is shown below.

LABEL	OP'N	OPERANDS
label	function	$p_1,\ldots,p_5$

The entry in the LABEL field will apply to the first instruction turned out by the macro instruction.

The entry in the OPERATION is a 3- or 4-letter function code, followed by either the number 4 (if TAPE4 was called) or the number 5 (if TAPE5 was called). This entry, together with the value supplied for parameter 1, determines what tape function is to be performed.

Parameters 2 through 5 specify changes in unit number, channel number, translation mode and recording density, and block size, where applicable. If a parameter is blank, or omitted, the last stated value, whether specified in the call or in another macro instruction, will be used.

p_2 Unit number: 0 through 15, or blank.

p_3 Channel number: 0 through 7, or blank. (Ordinarily, channels 4 and 5 are used for read functions and channel 5 is used for write functions.)

p_4 Translation mode and recording density: The appropriate entry from the table given under p_3 of the call, or blank.

p_5 Block size, or blank.

2.3.1 Initialize

a. Format

OP'N	OPERANDS
INITn	p_1,p_2,p_3

p_1 IN, if read functions are to be performed; or OUT, if write functions are to be performed. This parameter may be left blank if the input/output method is DMND.

p_2 Unit number, or blank.

p_3 Channel number, or blank.

b. Notes

1. This must be the first macro instruction executed.
2. Initial conditions are set in the TAPE4 or TAPE5 coding, but no tape orders are performed.
3. The absolute address of the first character position of the current area will be in the 4 LSC of AR1 when control is returned to the worker program.

Parameters 8, 9, and 10 can be used with the OPR Executive only. Parameters 8 and 9 provide translate functions for the UNISERVO VIC user.

2.3.2 Read

a. Format

OP'N	OPERANDS
READn	p_1,p_2,p_3,p_4,p_5

p_1 Blank, for a forward read; BACK, for a backward read; or CONT, for a backward contingency read. (BACK and CONT apply only to UNISERVO* IIIA tape units.)

p_2 Unit number, or blank.

p_3 Channel number, or blank.

p_4 Translation mode and density, or blank.

p_5 Block size, or blank.

b. Notes

1. One block of tape is read into the current input area.

2. When control is returned to the worker program, the absolute address of the first character of the block will be in the 4 LSC of AR1, and the number of characters actually read will be in the 4 LSC of AR2.

3. If a tape mark is read, control is returned to the worker program at the ending address (specified in p_7 of the call). No information is transferred into memory.

4. If either BACK or CONT is specified, all further READn and WRTn macro instructions must supply a value for translation mode and recording density (p_4).

5. If standby is being used, the first READn after an INITn will read a block into each half of the input area. The values in ARs 1 and 2 (see Note 2, above) will pertain to the first block read from tape.

2.3.3 Write

a. Format

OP'N	OPERANDS
WRTn	p_1,p_2,p_3,p_4,p_5

p_1 Blank, for a normal write; CONT for a contingency write (applies only to UNISERVO IIIA tape units); or MARK, to write a tape mark (applies only to compatible tapes).

p_2 Unit number, or blank.

p_3 Channel number, or blank.

p_4 Translation mode and density, or blank.

p_5 Block size, or blank.

b. Notes

1. In a normal write, or a contingency write, one block is written onto tape from the current output address. In a tape-mark write, a 1-character tape mark block is written onto tape, but no information is transferred from the current output address to tape.

2. If an end-of-tape condition is detected, control returns to the worker program at the ending address (specified in p_7 of the call).**

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**All further macro instructions for the same unit will return control to ending address until the tape has been rewound, or otherwise passed backward beyond the end-of-tape window.

3. When control is returned to the worker program either at the ending address or at the instruction following the macro instruction, the absolute address of the first character of the current output area will be in the 4 LSC of AR1.

4. If a contingency or tape-mark write is specified, all further READn and WRTn macro instructions must specify a value for translation mode and density (p_4).

2.3.4 Rewind

a. Format

OP'N	OPERANDS
RWDn	,p_2,p_3
LOCKn	,p_2,p_3

Operation: RWDn, for rewind without interlock;

or LOCKn, for rewind with interlock.

p_2 Unit number, or blank.

p_3 Channel number, or blank.

b. Notes

1. The current tape is rewound as indicated.

2. If further READn or WRTn macro instructions are to be executed, they must be preceded by an INITn.

2.3.5 Test Completion of Last Function

a. Format

OP'N	OPERANDS
CMPLn	

No parameters are specified.

b. Notes

1. This macro-instruction ensures the completion of all pending tape orders. Its execution is necessary only in the two following circumstances, and only if the standby method is being used.

   a. The worker program is about to terminate.

   b. A change in channel or unit number is going to be made in subsequent macro instructions.

2. If further READn or WRTn macro instructions are to be executed, they must be preceded by an INITn.

2.3.6 Backspace

a. Format

OP'N	OPERANDS
BKSPn	,p_2,p_3

p_2 Unit number, or blank.

p_3 Channel number, or blank.

b. Notes

1. The tape is backed up one block. No data are transferred to memory from tape.

2. If further READn or WRTn macro instructions are to be executed, they must be preceded by an INITn. In addition, each READn or WRTn must specify a value for translation mode and recording density (p_4).

3. This macro instruction applies only to compatible tapes.

2.3.7 Skip Erase

a. Format

OP'N	OPERANDS
SKIPn	,p_2,p_3

p_2 Unit number, or blank.

p_3 Channel number, or blank.

b. Notes

1. A skip-erase function is performed. No data are transferred from memory to tape.

2. If further READn or WRTn macro instructions are to be executed, they must be preceded by an INITn. In addition, each READn or WRTn must specify a value for translation mode and recording density (p_4).

3. This macro instruction applies only to compatible tapes.

2.3.8 Translate[1]

a. Format

OP'N	OPERANDS
TRANn	p_1,p_2

p_1 BCDI, if a BCD to XS3 translation is to be performed; or BCDO if an XS3 to BCD translation is to be performed.

p_2 Blank, if the data address supplied is a left-hand address (that is, it addresses the MSC of the data); or R, if the data address supplied is a right-hand address (that is, it addresses the LSC of the data).

b. Notes

1. The data address is set in TAPEn by the worker program. It is a 3 character field, the LSC of which is labeled XTnTØ. The (binary) number of characters to be translated is set in a 2 character field in TAPEn. Its LSC is labeled XTnT1. Up to 4095 characters may be translated at one time. (If a zero character count is specified, no translation function will be performed.)

2. The contents of XTnTØ and XTnT1 are not altered by the macro instruction.

3. The contents of the arithmetic registers and tetrands 16 and 18, are altered by the macro.

[1]This macro provides BCD-XS3 translation for the UNISERVO VIC user. It can be used with the OPR Executive Routine only.